B9708 PhD Research Methods - HW4

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1 Question 1

Obama's "cycle of crime" hypothesis implicitly asserts that harsh sentencing (or, perhaps, incarceration in general) directly *causes* recidivism (and vice versa, hence the "cycle"). Note that this causal claim is both distinct from and stronger than merely asserting a non-causal *association* between incarceration and recidivism.

2 Question 2

There are several issues with this simple research design. In particular, the design is likely to suffer from omitted variable bias due by failing to control for other variables that: (a) may help to explain variance in recidivism (i.e., the dependent variable), and (b) are also correlated with length of first prison sentence (i.e., the independent variable). A simple example may be severity of the crime. Clearly, more severe crimes (e.g., a Class A vs. Class C felony) will be associated with longer prison sentences, and is thus correlated with our independent variable. It may also be the case that individuals who commit more serious crimes are more likely to be serial offenders, thereby are inherently at a higher risk of recidivism - thus helping to explain variance in our dependent variable. Conversely, it may be that offenders of the most serious crimes are less likely to be recidivists because they are imprisoned for life, or receive death penalties! In any case, we can get around some of these omitted variable bias issues by introducing instrumental variables into our regression / causal analysis.

3 Question 3

insheet using crime-iv.csv, comma names clear

4 Question 4

To conduct the balance test, we need only establish that there is no statistically significant difference in crime severity assigned to Republican vs. Democratically appointed Judges. The other variables in our data (months in jail, and recidivism) occur *after* the defendant has already been assigned to a Judge, and are therefore not meaningful randomization selection criteria (if anything, they are potential treatment effects).

The results of a balance test for crime severity vs. Judge assignment is shown below in **Table 1**. The results indicate that defendants are in fact randomly assigned to Republican vs. Democratically-appointed judges - at least, based on severity of crime. It is nevertheless possible that there is some other non-random assignment taking place, for which we do not have the data to observe.

	Democratic Judge	Republican Judge	Difference
Severity of crime	1.979	1.966	0.014

Table 1: Balance test for evaluating random assignment of Republican-appointed Judges.

5 Question 5

The first stage of the IV design is to evaluate the relationship between the IV variable (independent variable) and compliance with treatment (dependent variable). Specifically, we want to run a regression with severity of sentence ("Months in jail") as the dependent variable and "Republican Judge" as the independent variable. We also include "Severity of crime" as a control variable, since this is an independent predictor of severity of sentencing. The results of this regression are shown below in **Table 2**.

	Months in jail
Republican Judge	3.2***
	(.37)
Severity of crime	18***
	(.23)
Constant	-19***
	(.52)
Observations	5000
R^2	0.565

Table 2: First-stage IV regression.

6 Question 6

The coefficient for 'Republican Judge' is 3.22 ($t = 8.77$, $p < 0.001$). This indicates that after controlling for severity of crime, defendants who are assigned to a Republican-appointed Judge will receive, on average, an additional 3.22 months in jail.

7 Question 7

	Recidivates
Republican Judge	.14***
	(.012)
Severity of crime	.19***
	(.0077)
Constant	-.11***
	(.018)
Observations	5000
R^2	0.128

Table 3: "Reduced form" IV regression.

This "reduced form" regression indicates that those defendants who are assigned to a Republican-appointed Judge are, on average, 14% more likely to become recidivists ($t = 11.47$, $p < 0.001$).

8 Question 8

The ratio of reduced form coefficient to first stage coefficient is .14 / 3.20 = 0.044.

9 Question 9

	Recidivates
Months in jail	.044***
	(.0058)
Severity of crime	-.62***
	(.11)
Constant	.75***
	(.11)
Observations	5000
R^2	-0.944

Table 4: Second-stage IV regression.

This second-stage regression indicates that, following random assignment to Republican or Democratically-appointed Judges, each additional month of sentencing is associated with a 4.4% increase in the risk of recidivism *for the compliers* ($t = 7.68$, $p < 0.001$).

10 Question 10

The F-statistic is $F(2, 4997) = 108.82$. This is significantly above the conventional threshold of $F(2, 4997) = 2.3026$ required to establish significance at the $p < 0.05$ level.

11 Question 11

We obtain the same coefficient estimate, *Months in jail* = 0.044 for both the ratio in Q8 and the IV coefficient in Q9, as expected.

12 Question 12

12.1 "Always-takers"

In the research design above (using randomized judges), the always-takers are the defendants who are always given a harsh sentence no matter what judge they are assigned to.

12.2 "Never-takers"

The never-takers are the defendants who are always given a lenient sentence no matter what judge they are assigned to.

12.3 "Compliers"

Compliers are the defendants who are given a harsh sentence only if assigned to a Republican-appointed Judge.

12.4 "Defiers"

Defiers are the defendants who are given a lenient sentence only if assigned to a Republican-appointed Judge.

13 Question 13

The monotonicity assumption essentially refers to the requirement that we should *not* have any defiers in our IV - that is, that treatment effects should be strictly unidirectional. In this context, a defier would exist if the defendant receives a more lenient sentence *only if* they are assigned to a Republican-appointed Judge. Although very unlikely, it is theoretically plausible that this may occur. For instance,

if the Judge is biased and has knowledge of the defendants' own political disposition as a Republican, then the judge may be inclined (consciously or subconsciously) to issue a more lenient sentence, due simply to their shared political affiliation / ideology. Alternatively, although Republican-appointed judges are observably more harsh *in general* and *on average*, it is possible that Republican-appointed judges are systematically more lenient than Democratically-appointed judges with respect to certain specific crimes (for instance, certain gun-related crimes). Ultimately however, there is no evidence of any defiers in the data and it is reasonable to assume that the potential for such defiers is sufficiently negligible as to not warrant concern.

14 Question 14

As previously stated, compliers are the defendants who are given a harsh sentence only if assigned to a Republican-appointed Judge. These types of defendants are likely to be charged with crimes that more overtly compromise Republican values or ideology (for instance, abortion-related crimes). I might also (very controversially) suggest that such defendants may also be more likely to be non-white, or a member of some minority ethnicity. In other words, Republican-appointed judges may be more systematically harsh toward minority groups.

15 Question 15

The "cycle of crime" hypothesis appears to be true for the compliers. The IV regression provides a coefficient for 'Months in jail' of 0.044, indicating that each additional month in jail increases the probability of recidivism by 4.4% *for the compliers*.